

## Notes On Western Australian Bossiaea Species (Fabaceae): 3

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### Abstract

Two leafless Western Australian *Bossiaea* species, *B. halophila* and *B. cucullata*, are described as new. Descriptions, illustrations and distributions are provided. Both species are associated with salt lake systems. The likely pollination syndrome for each species is discussed briefly.

### Introduction

The only comprehensive account of the Western Australian *Bossiaea* species was provided by Bentham (1864) in his treatment of the entire genus. This paper is the third in a series dealing with the Western Australian species (Ross, 1994a, 1994b). Recent studies have disclosed the existence of two undescribed species that are associated with salt lake systems in south-western Western Australia. Names for these two species are made available now rather than waiting until a full revision is completed.

### *Bossiaea halophila* J.H. Ross, sp. nov.

*Bossiaea leptacanthae* E. Pritz. affinis, a qua habitu largiore multo, bracteolis caducis cito, floribus grandioribus, petalis carinae apicibus et sinibus pubescentibus, ovariis sutura supra pilis vestitis, differt.

*Type:* Western Australia, W shore of Lake King near start of causeway, 1 Nov. 1996, M.G. Corrick 11479 (holotypus MEL; isotypi CANB, K, NSW, NY, PERTH)

*Shrub*, rigid, erect, much-branched, to 1.4 m high and 2 m wide, almost completely glabrous except for hairs in the axils of the scale leaves and scattered hairs on young growth; branches ascending, flattened or elliptic, ultimate branches of cladodes 0.75–2.2 mm wide, scarcely or narrowly winged, notched at the nodes, sometimes ending in an acute point but scarcely pungent-pointed, longitudinally striate, growth of current season green or greenish-blue but older growth usually with a thin greyish-white waxy surface that exfoliates when the branches dry. *Leaves* reduced to ovate brown scales up to 1.8 mm long, alternate. *Flowers* solitary at the nodes, pedicellate, the pedicels 6–8 mm long, glabrous throughout or with scattered appressed hairs. *Bracts* several, soon deciduous, brown, ovate, increasing in size towards the apex of the pedicel, the uppermost up to 0.7 mm long, with conspicuous marginal cilia; bracteoles usually inserted above the middle of the pedicel, overlapping the base of the calyx in bud but rapidly deciduous, narrow-elliptic, up to 1.7 mm long, scarious, longitudinally striate, with marginal cilia, the cilia prominent apically. *Calyx* green but the upper lobes suffused with pink or red, the median line darker, usually glabrous throughout externally apart from cilia on the margins of the lobes but occasionally with a few scattered appressed hairs towards the apices of the lobes or sometimes throughout: 2 upper

lobes 4.7–6.5 mm long including the tube 3.3–4 mm long, 3 lower lobes 1.1–2 mm long. *Standard* about as long as or slightly longer than the keel petals, 10–13.5 mm long including a claw 2–5.5 mm long, 8.8–9.5 mm wide, yellow internally with a reddish-brown throat from which numerous red-brown longitudinal striations radiate into the lamina, yellow externally apart from the red-brown base from which red-

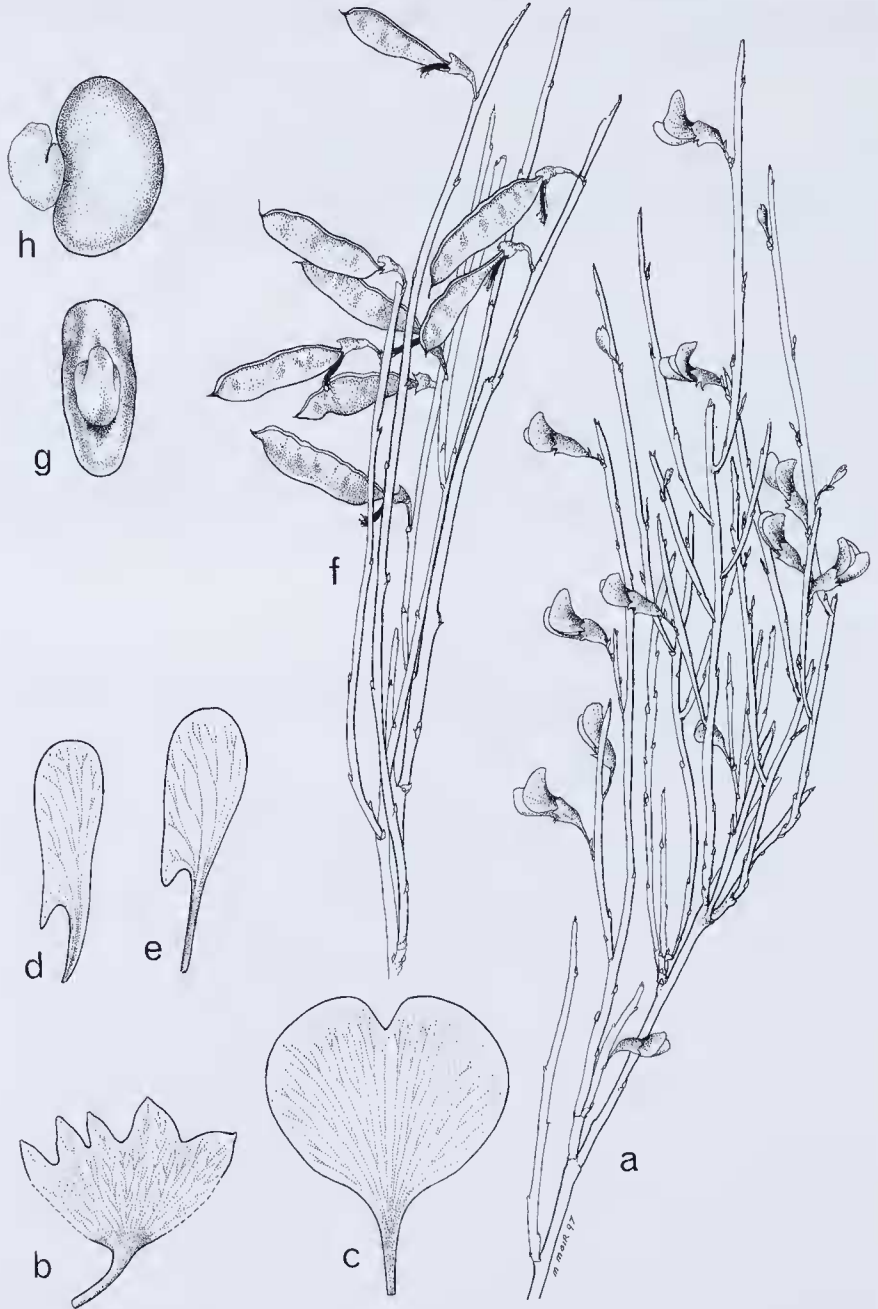


Fig. 1. *Bossiaea halophila*. a flowering twig, x 0.8; b calyx opened out, upper lobes on right, x 2.4; c standard, x 2.4; d wing petal, x 2.4; e keel petal, x 2.4; f fruiting twig, x 1 (Corrick 11479); g seed, hilar view, x 8; h seed, side view, x 8 (Ross 3866).

brown longitudinal striations radiate into the lamina; wings about as long as the keel petals, 9–10.5 mm long including a claw 2.5–3.8 mm long, 1.9–2.8 mm wide, yellow throughout or with a longitudinal red-brown striation towards the lower margin; keel petals 9.5–10.6 mm long including a claw 3–4 mm long, 3.5–4.2 mm wide, pale greenish-yellow throughout or sometimes with a red-brown longitudinal striation towards the lower margin, with woolly hairs apically and in the sinus. *Stamen-filaments* 7.2–10.8 mm long. *Ovary* 5–7 mm long, on a stipe 1.2–3.2 mm long, glabrous apart from hairs on the upper suture, 6–10-ovulate; style 2.4–4 mm long. *Pods* oblong, 1.3–3 cm long, 0.4–0.6 cm wide, stipe about as long as the calyx-tube, valves with appressed hairs on the margins when young but glabrescent, transverse venation not conspicuous, pale chestnut- or pinkish-brown. *Seeds* elliptic-oblong, 2.6–3.4 mm long, 1.6–2.3 mm wide, a uniform pale fawn, the small hilum covered by a hooded cap-like aril. (Fig. 1)

*Representative specimens* (13 examined):

**Western Australia:** Pingrup, x.1933, *W.E. Blackall 3097* (PERTH); 10km W of Pingaring, 12.x.1977, *G.J. Keighery 1104* (PERTH). 10.6 km SE of Hyden on Hyden-Varley Rd., 27.xi.1996, *J.H. Ross 3862* (MEL, PERTH). W shore of Lake King, 12 km W of Lake King general store on Lake King-Newdegate Rd., 27.xi.1996, *J H Ross 3866* (CANB, MEL, PERTH); W shore of Lake Grace, 8.6 km W of Lake Grace Post Office on Lake Grace-Kukerin Rd, 28.xi.1996, *J.H. Ross 3873* (MEL, PERTH).

#### *Distribution and Conservation Status*

Occurs in the Roe Botanical District of the Southwestern Botanical Province as defined by Beard (1980) where it is recorded from the vicinity of Pingaring to SE of Hyden in the north, southwards to the vicinity of Pingrup in the west with an outlying population at Lake King. *Bossiaea halophila* is not considered rare or threatened at present. (Fig.2)

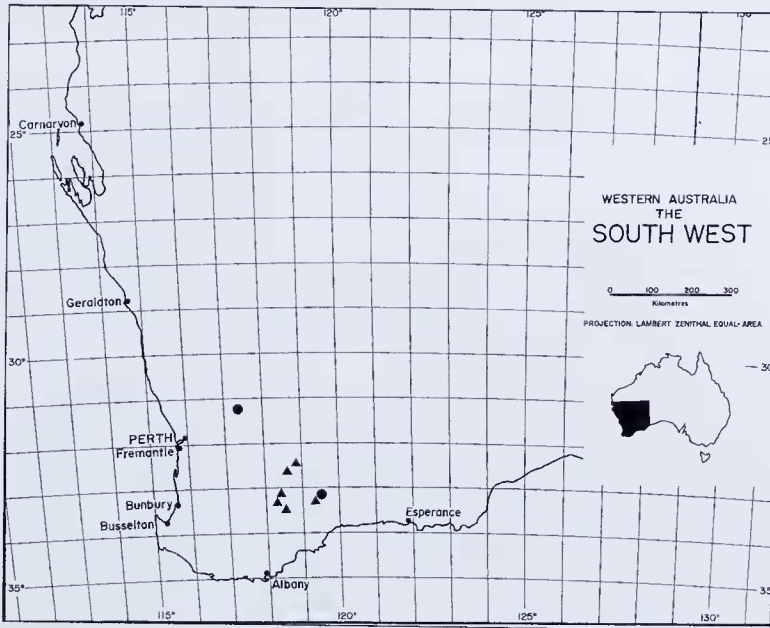


Fig 2. Distribution of *Bossiaea halophila* (▲) and *Bossiaea cucullata* (●) in Western Australia

### *Habitat*

Favours well-drained deep sand around salt lake systems. Often in association with mallee eucalypts, *Melaleuca* spp., and Chenopodiaceae, sometimes also with *Santalum acuminatum* and *Scaevola spinescens*. On the western shore of Lake King *B. halophila* grows in association with *B. cucullata*.

### *Phenology*

Recorded flowering in May, September to early November. Fruits: November and December.

### *Notes*

*Bossiaea halophila* differs from *B. leptacantha* in being a much larger erect shrub with ascending branches (*B. leptacantha* grows as a low spreading shrub which branches at ground level and usually lacks a single well-defined erect aerial stem), in having the ultimate cladodes more distinctly flattened, the older stems with a thin waxy layer that exfoliates tardily (this layer is much thinner and less conspicuous than in *B. leptacantha*), the bracteoles on the pedicels rapidly deciduous, larger flowers, the keel petals clothed with scattered woolly hairs apically and in the sinus, and the ovaries with scattered hairs on the upper suture. Flower colour also differs. The flowers in *B. leptacantha* are usually uniformly yellow although on occasional plants the standard has a basal red flare internally from which red striations radiate into the lamina; in *B. halophila* the standard is yellow internally with a reddish-brown throat from which reddish-brown striations radiate into the lamina.

The ecological preferences of the two species differ; *B. leptacantha* favouring sandy soil, clay or clay-loam, often over limestone, and frequently away from salt lake systems whereas *B. halophila* favours deep sand near salt lake systems. The distribution of the two species does not overlap, *B. leptacantha* occurring much further east than *B. halophila* from the vicinity of Peak Charles in the west to Madura in the east.

The predominantly yellow flowers with reddish-brown longitudinal striations suggest that *B. halophila* is pollinated by insects.

### *Etymology*

From Greek and meaning 'salt-loving', in allusion to the preferred habitat of the species on the margins of salt lake systems.

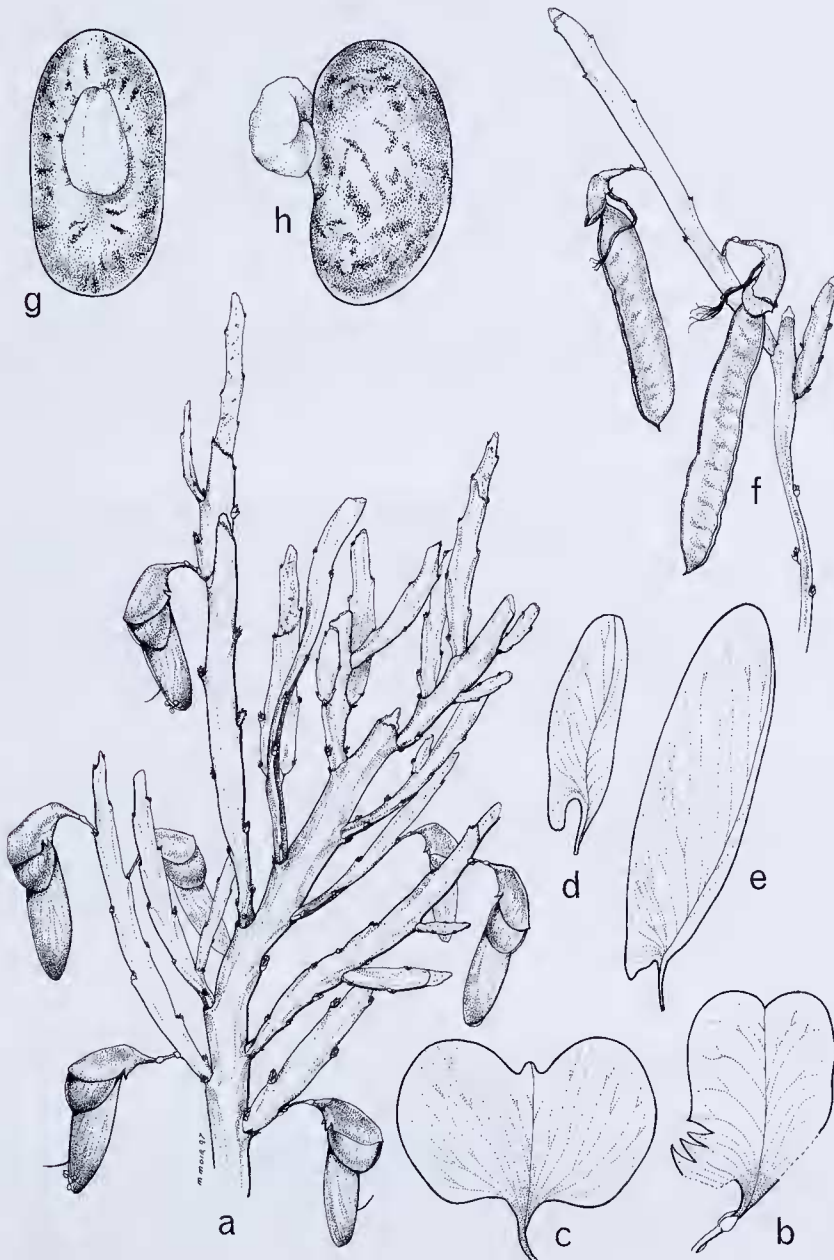
### ***Bossiaea cucullata* J.H. Ross, sp nov.**

*B. walkerae* F. Muell. affinis, a qua floribus coloratis aliter, bracteis et bracteolis ad 1 mm longas, bracteolis persistentibus, pedicellis infra bracteolas pubescentibus, leguminibus brevioribus et angustioribus plerumque, differt.

*Type:* Western Australia, western shore of Lake King, 14.x.1997. *B.Archer* 840 (holotypus MEL; isotypi K, PERTH)

*Shrub*, rigid, erect, dense, multi-stemmed, intricately branched, to 2 m high and 3 m wide, almost completely glabrous; branches terete to oval or slightly flattened, ultimate branches of cladodes 2–5 mm wide, narrowly winged, notched at the nodes, sometimes terminating in a pungent point, usually with a white waxy surface that exfoliates when the branches dry, sparingly to densely clothed with appressed hairs when young. *Leaves* reduced to scales c. 2 mm long, alternate. *Flowers* solitary at the nodes or rarely paired, pendulous, pedicellate, the pedicels up to 5mm long, usually glabrous above the bracteoles and sparingly clothed with appressed hairs below. *Bracts* several, distichous, brown, broad-ovate, increasing in size towards the apex of the pedicel, the uppermost up to 1 mm long, with conspicuous marginal cilia and densely clothed externally with appressed hairs;

bracteoles inserted towards the middle of the pedicel, broad-ovate, up to 1mm long, brown, with marginal cilia and scattered appressed hairs externally especially towards the apex, persisting until the pods mature. *Calyx* green suffused with purplish-brown on the adaxial surface, glabrous externally apart from the ciliate margins of the lobes, pubescent internally, persisting until fruits mature: 2 upper



**Fig. 3.** *Bossiaea cucullata*. **a** flowering twig, x 0.8; **b** calyx opened out, upper lobes on right, x 2.4; **c** standard, x 2.4; **d** wing petal, x 2.4; **e** keel petal, x 2.4 (Corrick 11227); **f** fruiting twig, x 0.8; **g** seed, hilar view, x 8; **h** seed, side view, x 8 (Ross 3865).

lobes much larger than the lower three, 10.5–14.4 mm long including the tube 3–3.5 mm long, 3 lower lobes 1.5–2.4 mm long, somewhat recurved apically. *Standard* much shorter than the keel petals, 12.5–14.4 mm long including a claw 4.5–5 mm long, 14–15.5 mm wide, deep yellow or orange-yellow externally and sometimes suffused with dark red or purple apically; wings about the same length as the standard and much shorter than the keel petals. 13.2–15 mm long including a claw 3.5–4 mm long, 3.7–4 mm wide, same colour as standard; keel petals 22.8–26 mm long including a claw 2.6–4 mm long, 6–8 mm wide, deep red. *Stamen-filaments* 16.5–29 mm long. *Ovary* 5–15 mm long, on a stipe up to 5 mm long, glabrous, 10–18-ovulate; style 8.5–10.2 mm long. *Pods* oblong, 2.5–4.8 cm long, 0.5–0.7 cm wide, stipe about as long as the calyx-tube but much shorter than the upper lobes, valves glabrous, not conspicuously transversely venose, pale brown or greenish-brown and often suffused with pink. *Seeds* elliptic-oblong, 2.6–4.1 mm long, 1.9–2.6 mm wide, with black mottles on a yellow or olive background, seldom uniformly yellow or olive. (Fig. 3)

*Representative specimens (12 specimens examined):*

**Western Australia:** Lake Derdibin, 16 km S of Wyalkatchem, 21.ii.1992. *B.H. Smith 1641* (MEL, PERTH); 13.x.1993. *B.H. Smith 1703* (MEL, PERTH); 25.x.1994. *B.H. Smith 1743* (MEL); western edge of Lake King, 7.ix.1986. *P.S. Short 2747* (CANB, MEL, PERTH); 24.ix.1996. *M.G. Corrick 11227* (MEL); 27.xi.1996. *J.H. Ross 3865* (CANB, MEL, PERTH).

*Distribution and Conservation Status*

Known only from Lake Derdibin and Lake King in the Avon and Roe Botanical Districts respectively of the Southwestern Botanical Province as defined by Beard (1980). These two populations are separated by a distance of over 200 kilometres. The Lake Derdibin population consists of about forty individuals and the Lake King population of over one hundred. As *B. cucullata* is known currently from only two populations, it is considered rare. The Western Australian Conservation Code of Priority 4 is considered appropriate for this species. (Fig. 2)

*Habitat*

Favours deep gypsum sand near salt lakes. The northern population occurs about 50 metres from the southern shore of Lake Derdibin in association with *Melaleuca thyooides* and several *Chenopodiaceae*. It is a harsh site where the plants grow as dense impenetrable shrubs. The older branches are covered with a white 'bloom' which imparts a greyish-white hue to the plants. The southern population grows near the western shore of Lake King but the site appears slightly less inhospitable and the plants tend to be smaller and more open.

*Phenology*

Flowers September and October. Fruits: November and December.

*Notes*

Superficially similar to *B. walkeri* with which *B. cucullata* was initially confused. However, *B. cucullata* differs from *B. walkeri* in having differently coloured flowers; in *B. walkeri* the standard is usually uniformly red or salmon pink (rarely pale yellow) or occasionally suffused with orange or sometimes burgundy basally, whereas in *B. cucullata* the standard is predominantly deep yellow or orange-yellow externally throughout or suffused with dark red or purple apically. The yellow standard in *B. cucullata* contrasts strongly with the deep red or burgundy keel petals, the lower three calyx lobes are smaller in relation to the size of the upper lobes than is the case in *B.*

*walkeri*, the bracteoles persist on the pedicel until the pods mature, the bracts and bracteoles are smaller (to 1mm long), the pedicels are pubescent below the point of attachment of the bracteoles, and the pods are usually shorter and narrower.

In contrast to *B. walkeri* which has a widespread distribution in southern mainland Australia and grows in a variety of habitats, *B. cucullata* is known from only two disjunct localities in Western Australia and is confined to deep sand near salt lakes. A close inspection of the numerous salt lakes that occur in the area between the two populations may reveal additional populations. *Bossiaea cucullata* grows in closer proximity to salt lakes than *B. walkeri* and presumably is more tolerant of salt than the latter species. The distribution of the two species does not appear to overlap.

The pendulous tendency of the flowers, the reduced size of the standard and wing petals, and the large elongated red keel petals suggest that *B. cucullata* is pollinated by birds (probably honeyeaters). As far as is known, there are no direct observations of birds visiting flowers of *B. cucullata* but a visit to the Lake King population in spring would surely remedy this deficiency. The flowers of *B. walkeri* are also thought to be pollinated by birds. Bird-pollination is relatively common among genera of the tribe Mirbelieae (Crisp 1996).

There is a suggestion that flower colour in the two populations may differ slightly but, apart from this and the differences in growth form, no significant differences have been noted between the plants in the two populations.

The species is depicted as *Bossiaea* sp. in Corrick and Fuhrer 56, pl.129 (1996).

### Etymology

From the Latin '*cucullus*', a hood, in allusion to the two enlarged upper calyx lobes that tend to form a hood over the pendulous flower.

### Acknowledgements

I am most grateful to Basil and Mary Smith for their hospitality and for responding to requests for additional material of *B. cucullata* over the years. I am especially grateful to Basil for venturing out one incredibly hot summer day to take me to visit the population of *B. cucullata* at Lake Derdibin. I am grateful to the Director of the Western Australian Herbarium for access to collections and for the loan of material, to my colleagues Neville Walsh for checking the Latin diagnoses and Mali Moir for executing the illustrations that accompany this paper; to Margaret Corrick for collecting excellent material of both species in response to requests, and to Barbara Archer for providing excellent collections, photographs, and specific information about *B. leptacantha*.

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